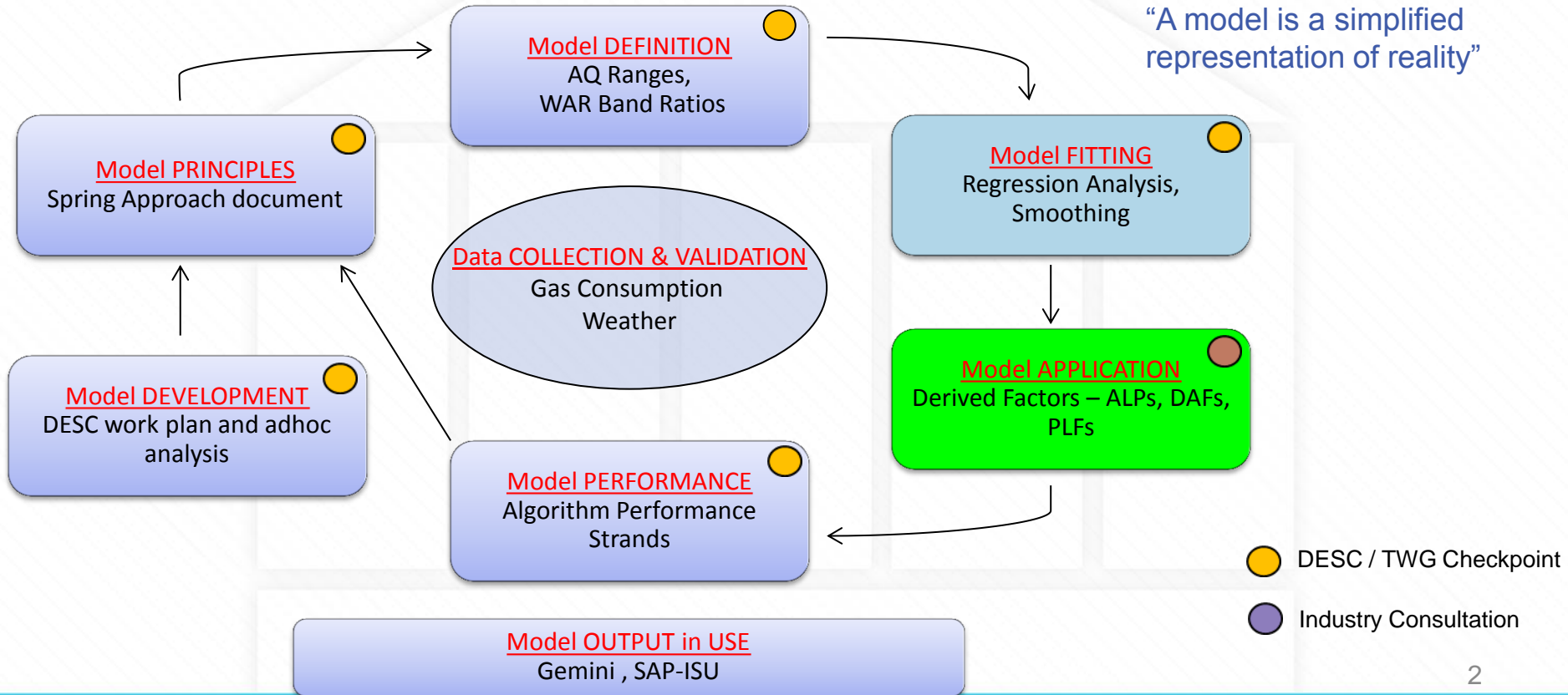# Response to Representations on 2019/20 NDM Algorithms

DESC: 22nd July 2019

Overview: EUC & Demand Model Lifecycle

The purpose of the EUC Demand Model is to represent the behaviour and reactions of the EUC Population

"A model is a simplified representation of reality"

Model DEFINITION
AQ Ranges, WAR Band Ratios

Model PRINCIPLES
Spring Approach document

Model FITTING
Regression Analysis, Smoothing

Data COLLECTION & VALIDATION
Gas Consumption
Weather

Model DEVELOPMENT
DESC work plan and adhoc analysis

Model APPLICATION
Derived Factors – ALPs, DAFs, PLFs

Model PERFORMANCE
Algorithm Performance Strands

Model OUTPUT in USE
Gemini , SAP-ISU

DESC / TWG Checkpoint

Industry Consultation

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Overview: Demand Estimation Timetable - 2019

High Level View of Demand Estimation Timetable 2019 - Key Checkpoints

PHASE	JAN'19	FEB'19	MAR'19	APR'19	MAY'19	JUN'19	JUL'19	AUG'19	SEP'19	OCT'19	NOV'19	DEC'19
1. MODEL PRINCIPLES	░░	░░										
Spring Approach 2019 Approved (DESC)		11th Feb										
2. Data COLLECTION & VALIDATION		░░	░░	░░								
Sample data validated (CDSP)				15th Apr								
3. MODEL DEFINITION				░░								
Agree Data Aggregations / WAR Band Limits (TWG)				24th Apr								
4. MODEL FITTING				░░	░░							
Small & Large NDM Single Year modelling review (TWG)					13th May							
5. MODEL APPLICATION					░░	░░	░░					
Publication of Draft Derived Factors (CDSP)						3rd Jun						
Derived Factors Approved for wider industry (TWG/DESC)							8th Jul					
Final Approval of Derived Factors (DESC)							22nd Jul					
6. MODEL OUTPUT IN USE							░░	░░				
SAP-ISU and Gemini updated (CDSP)								15th Aug				
7. MODEL DEVELOPMENT							░░	░░	░░	░░	░░	░░
Adhoc Work-plan approved (DESC)							22nd Jul			7th Oct		
8. MODEL PERFORMANCE										░░	░░	░░
Strands 1 to 4 reviewed (DESC)												9th Dec

Objective for today

- The final objective of the "Model Application" phase is for TWG, DESC and the industry to review the Derived Factors – ALPs, DAFs and PLFs in order to approve final versions to be used in Gemini and SAP-ISU for the new Gas Year

- Objective of this agenda item is to:

    – Complete DESC's review of NDM proposals (Pre-payment EUCs outstanding)
    – DESC to review any industry representations on proposals for Gas Year 2019/20
    – To gain DESC support to formally approve and finalise this year's proposals
    – Review analysis of uplift factors in 2018/19 to inform decision on uplift factors in Gas Year 2019/20
    – Confirm remaining activities relating to proposals for Gas Year 2019/20

DESC Review

- At 8th July meeting, DESC approved all profiles for Gas Year 2019/20 except those relating to the Domestic Pre-payment EUCs (xx:E1901BPD and xx:E1902BPD)

- For these EUCs, inconsistencies and unusual results with the profiles (ALPs and DAFs) and Peak Load Factors (PLFs) were highlighted in the DESC representations (see 8th July material)

- Various options were discussed which DESC filtered down to two, namely:

  - Apply the Domestic PPM demand model used in the MOD451AV adjustments process

  - Select the standard Non-Prepayment Domestic profiles until additional years data is available to produce a more robust model

- A revised set of PPM parameters were produced and provided for DESC to review on 11th July

  - The ALPs, DAFs and PLFs for all LDZs exhibit a less weather sensitive profile

- As of 17th July there have been no comments received on these revised profiles and factors

- Are DESC happy to approve the latest version of PPM parameters ?

Wider Industry Responses

- Following DESC on 8th July, a note was issued to the industry advising that proposals for Gas Year 2019/20 were available for review and comment – with the deadline for comments by 16th July

- We can confirm there has been <u>no additional comments </u>received outside of DESC and TWG on this years draft proposals

- Are DESC now happy to provide final approval of this years EUCs, Demand Models and Derived Factors for use in Gas Year 2019/20 ?

- Note: Discussion on use of uplift factors to follow (this is separate to providing approval on the formal output from the modelling process)

Uplift Factors

- Last Summer, DESC approved a proposal to amend the approved ALPs (for Band 1 only) and DAFs (all EUCs) with an 'uplift factor'. The intention of the uplift factors were to primarily reduce the volatility of UIG

- Analysis of UiG was presented in April to review the impacts during Gas Year 2018/19. This has been refreshed to include up to end of June 2019

- In April, DESC approved the use of uplift factors for the <u>DAF only </u>for Gas Year 2019/20 and so for information a further strand of analysis has been done which reviews UiG for Gas Year 2018/19 applying a DAF uplift only

Objective 1: Analysis

- <u>Objective 1</u>: To review the impacts of UIG uplift factors for gas year 2018/19 so far

- Analysis has utilised the following data

  - LDZ Inputs, DM Measurements and Shrinkage
  - Daily NDM AQ
  - ALPs and DAFs with uplift factors (referred to as "Actual" in analysis)
  - ALPs and DAFs (referred to as "No Uplift" in analysis)

- A simulation of NDM demand with and without uplift factors has been performed in order to understand the impacts to UIG with a comparison of the simulated UIG values for "Actual" and "No Uplift" carried out

- This has been done for all 13 LDZs (excl. Scottish independent sites) for the period 1st October 2018 to 30th June 2019

Statistical measures used in the analysis

The following statistics have been calculated at national and LDZ level by month:

- The average UIG percentage

- The Mean Absolute Percentage Error (MAPE) has been calculated to remove the directional bias and show where the largest deviation from zero is

- The standard deviation and variances have also been calculated to measure if there is any reduction in volatility (the smaller the value – the less variable the data is)

Analysis at National level
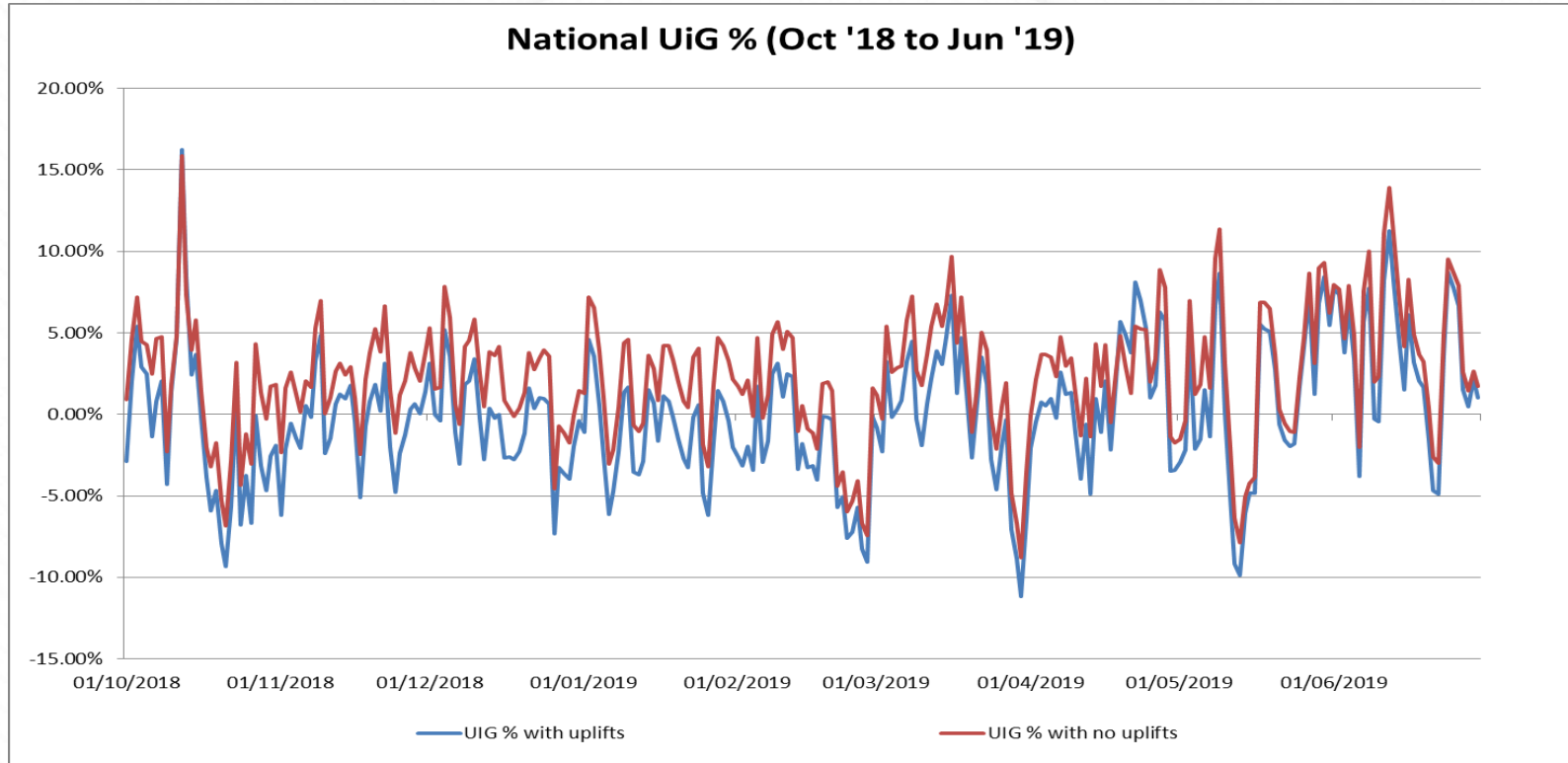
National UiG % (Oct '18 to Jun '19)

Legend: UIG % with uplifts — UIG % with no uplifts

This chart shows the daily national UiG percentage levels for actual UiG (with uplift factors applied) and what UiG would have been if no uplift factors had been applied

Analysis at National level cont…

The following table displays the statistics for UiG at national level, by month, for all 13 LDZs (excluding the Scottish independent sites)

The cells highlighted in green are the values which are closest to zero when comparing the actual UiG value against the simulated UiG value.

Month	Average UiG %		MAPE		Std Dev.	
	No uplift	Actual (uplifted)	No uplift	Actual (uplifted)	No uplift	Actual (uplifted)
Oct	1.74%	-0.72%	3.86%	4.16%	0.0456	0.0530
Nov	2.27%	-0.38%	2.66%	1.83%	0.0221	0.0243
Dec	2.10%	-0.50%	2.67%	2.06%	0.0265	0.0264
Jan	2.03%	-1.06%	2.84%	2.26%	0.0268	0.0265
Feb	0.00%	-2.41%	3.06%	3.35%	0.0378	0.0342
Mar	2.27%	-0.14%	4.04%	3.16%	0.0424	0.0421
Apr	2.79%	1.29%	3.21%	2.85%	0.0259	0.0341
May	2.39%	0.62%	4.58%	4.23%	0.0507	0.0505
Jun	5.16%	3.52%	5.67%	4.56%	0.0422	0.0420

Analysis at LDZ level

LDZ	Oct '18 to Jun '19			
	Average UIG % no uplifts	Average UIG % with uplifts	MAPE UIG no uplifts	MAPE UIG with uplifts
SC	2.37	0.34	3.99	3.74
NO	3.02	0.90	4.72	4.38
NW	1.51	-2.71	5.35	5.37
NE	2.44	-0.97	4.59	4.23
EM	2.23	0.06	3.94	3.60
WM	2.45	0.10	4.46	4.32
WN	1.77	-2.44	5.31	5.46
WS	1.30	-0.21	4.16	4.09
EA	1.06	-3.21	3.66	4.70
NT	3.89	3.12	4.61	4.31
SE	1.90	1.92	3.75	4.02
SO	1.54	-0.77	4.06	3.91
SW	3.39	2.22	6.73	6.71

This table shows the UiG averages and MAPEs by LDZ for all months (Oct '18 to Jun '19)

The cells highlighted in green are the values which are closest to zero

9 of the 13 LDZs had an average UiG closest to zero where the uplift factors had been applied

9 of the 13 LDZs had a smaller MAPE where the uplift factor had been applied

Conclusions – Objective 1

- Applying an uplift to the ALP and DAF in gas year 2018/19 has reduced the average UiG (by month and by LDZ analysis) and helped to marginally improve volatility

- However, the average UiG over the winter period (October '18 to March '19) has been negative which is unexpected and suggests the ALP uplift factors have increased the 01B NDM demand too much

- Over the summer period so far (Apr to Jun), UiG has on average been a smaller positive value

Objective 2: Analysis

- <u>Objective 2</u>: To review the impacts of UIG uplift factors <u>(DAF only)</u> for gas year 2018/19 so far

- Analysis has utilised the following data

  - LDZ Inputs, DM Measurements and Shrinkage
  - Daily NDM AQ
  - ALPs and DAFs with uplift applied to DAF only (referred to as "DAF only uplifted" in analysis)

- A simulation of NDM demand with and without uplift factors has been performed in order to understand the impacts to UIG with a comparison of the simulated UIG values for "Actual", "No Uplift" and "DAF only uplifted" carried out

- This has been done for all 13 LDZs (excl. Scottish independent sites) for the period 1st October 2018 to 30th June 2019

Analysis at National level
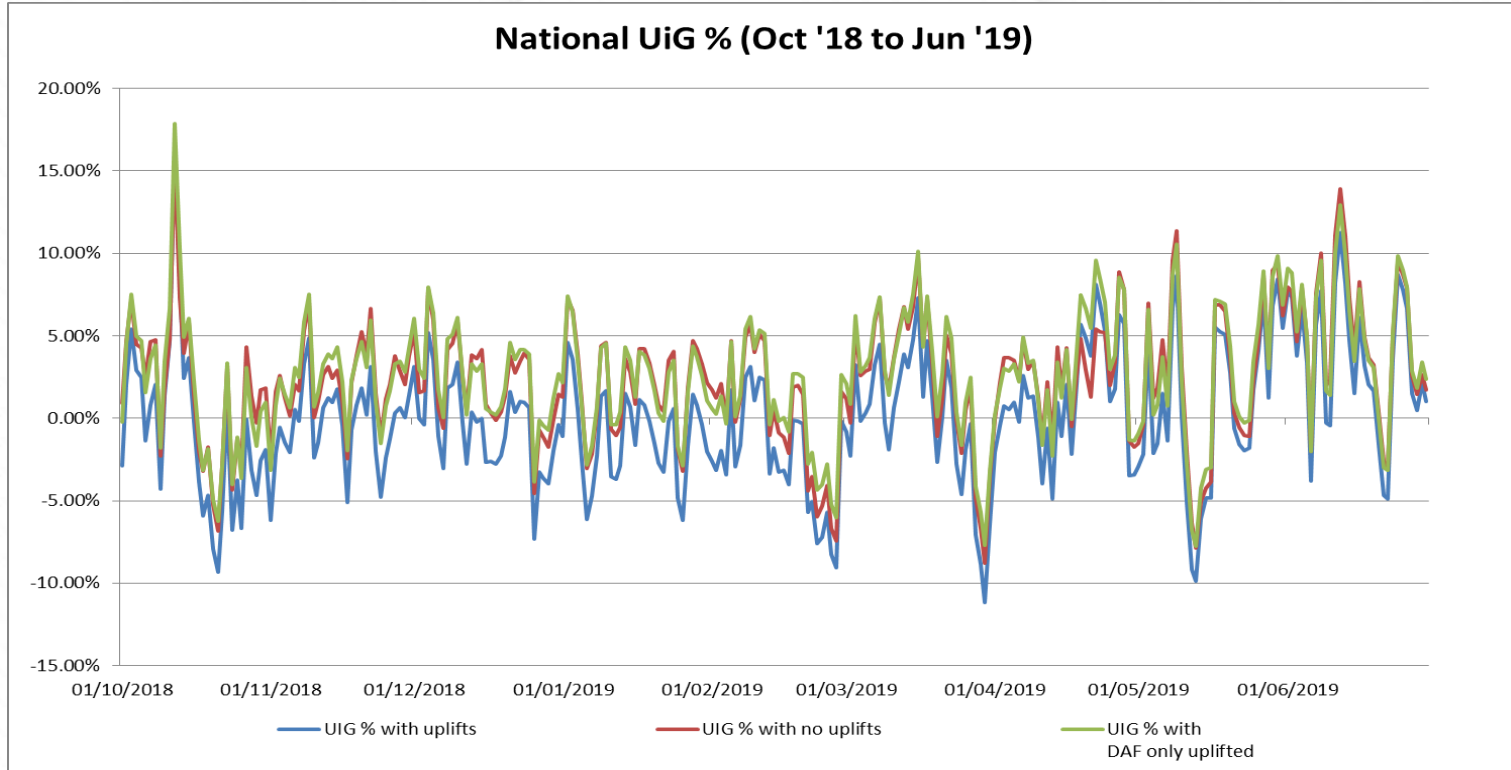
National UiG % (Oct '18 to Jun '19)

Legend: UIG % with uplifts — UIG % with no uplifts — UIG % with DAF only uplifted

This chart shows the daily national UiG percentage levels for actual UiG (with uplift factors applied), UiG if no uplift factors had been applied and UiG with uplift factors applied to DAF **only**

Analysis at National level cont…

The following table displays the statistics for UiG at national level, by month, for all 13 LDZs (excluding the Scottish independent sites)

The cells highlighted in green are the values which are closest to zero when comparing the actual UiG value against the simulated UiG value.

Month	Average UiG %			MAPE			Std Dev.		
	No uplift	Actual (uplifted)	DAF only uplifted	No uplift	Actual (uplifted)	DAF only uplifted	No uplift	Actual (uplifted)	DAF only uplifted
Oct	1.74%	-0.72%	1.87%	3.86%	4.16%	3.99%	0.0456	0.0530	0.0498
Nov	2.27%	-0.38%	2.48%	2.66%	1.83%	2.92%	0.0221	0.0243	0.0229
Dec	2.10%	-0.50%	2.54%	2.67%	2.06%	2.87%	0.0265	0.0264	0.0254
Jan	2.03%	-1.06%	2.00%	2.84%	2.26%	2.64%	0.0268	0.0265	0.0253
Feb	0.00%	-2.41%	0.63%	3.06%	3.35%	2.69%	0.0378	0.0342	0.0335
Mar	2.27%	-0.14%	2.79%	4.04%	3.16%	4.23%	0.0424	0.0421	0.0408
Apr	2.79%	1.29%	3.40%	3.21%	2.85%	3.85%	0.0259	0.0341	0.0322
May	2.39%	0.62%	2.51%	4.58%	4.23%	4.39%	0.0507	0.0505	0.0493
Jun	5.16%	3.52%	5.09%	5.67%	4.56%	5.63%	0.0422	0.0420	0.0415

Analysis at LDZ level

LDZ	Oct '18 to Jun '19					
	Average UIG % no uplifts	Average UIG % with uplifts	Average UIG % DAF only uplifted	MAPE UIG no uplifts	MAPE UIG with uplifts	MAPE UIG DAF only uplifted
SC	2.37	0.34	2.64	3.99	3.74	4.11
NO	3.02	0.90	3.50	4.72	4.38	4.93
NW	1.51	-2.71	1.51	5.35	5.37	5.35
NE	2.44	-0.97	2.88	4.59	4.23	4.63
EM	2.23	0.06	2.58	3.94	3.60	4.06
WM	2.45	0.10	2.58	4.46	4.32	4.51
WN	1.77	-2.44	1.77	5.31	5.46	5.31
WS	1.30	-0.21	1.47	4.16	4.09	4.22
EA	1.06	-3.21	1.30	3.66	4.70	3.64
NT	3.89	3.12	4.16	4.61	4.31	4.78
SE	1.90	1.92	2.38	3.75	4.02	4.14
SO	1.54	-0.77	1.95	4.06	3.91	4.22
SW	3.39	2.22	3.89	6.73	6.71	7.16

This table shows the UiG averages and MAPEs by LDZ for all months (Oct '18 to Jun '19)

The cells highlighted in green are the values which are closest to zero

9 of the 13 LDZs had an average UiG closest to zero where the uplift factors had been applied

9 of the 13 LDZs had a smaller MAPE where the uplift factor had been applied

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Conclusions

- Applying an uplift only to the DAF in gas year 2018/19 has not reduced the average UiG (by monthly or LDZ analysis) or helped to significantly improve volatility

- In most cases, applying a DAF uplift only has increased UiG on average

- Do DESC wish to review the decision to apply the DAF only uplifts in gas year 2019/20?

Next Steps

- w/c 22nd July

  - Assuming DESC approve the NDM proposals today, the CDSP will on behalf of DESC inform the industry and Ofgem that the proposals are now final

  - CDSP will apply uplift factors (if DESC vote to do so) and produce a version for use in Gemini to support NDM Nominations and Allocations

- w/c 29th July

  - CDSP will publish the final proposals to the industry and submit interface files to key systems (no later than 15th August)

- Note, in addition to the usual annual activities, the CDSP shall also update SAP-ISU with historical ALPs and DAFs for the new EUCs, namely 01BND, 01BNI, 01BPD, 01BPI, 02BND, 02BNI, 02BPD and 02BPI. This is required for subsequent AQ calculations post October 2019.

  To avoid large differences in AQ movement the historic values of ALPs and DAFs will be those relating to the consumption band at the time i.e. 01B and 02B respectively

Reminder: Where to find Demand Estimation Data

- Folder structure on secure website:

18. NDM Profiling and Capacity Estimation Algorithms

> 2019-20 Gas Year

>> 1. Spring Approach Document

>> 2. Demand Estimation Sample Data

>> **3. Demand Estimation Parameters**

>>> **a. End User Categories and Derived Factors**

>>> **b. Demand Model Supporting Files**

>> 4. NDM Algorithms Booklet

- Folders highlighted green will contain the final NDM proposals for Gas Year 2019/20

- The summary of the end to end process followed this year will be available in Folder 4. NDM Algorithms Booklet (delayed this year due to issue with PPM models)

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